



# HISTORICAL BOILERS INSPECTION GUIDELINE

Owner		Location	
Make	Year	Engine Number	
Heating Surface	Design Pressure	Current Operating Pressure	Inspector

## Smoke Box

### 1. Front Tube Sheet

- Yes  No a. Check condition of sheet and thickness around handhole openings.
- Yes  No b. Check condition of threaded openings and plugs.
- Yes  No c. Check condition of rivets between sheet and shell.

### 2. Tubes

- Yes  No a. Are tubes beaded?
- Yes  No b. Are there signs of leakage?
- Yes  No 3. Check condition of smoke box shell (especially around lower surfaces).
- Yes  No 4. Check inside condition of barrel and O.D. of tubes.
- Yes  No 5. Check back side of tube sheet (especially area in contact with handhole gasket and area where tube sheet joins barrel).
- Yes  No 6. Check tube sheet supports (through stays, supports or strong backs).
- Yes  No 7. Check inside rivet heads on lap or buttstrap joints.
- Yes  No 8. Check front bolster (front axle) attachment points inside shell.

## Barrell (shell)

- Yes  No 1. Check front bolster attachment points on outside of shell.
- Yes  No 2. Check condition of tube sheet rivets on outside of shell.
- Yes  No 3. Check condition of threaded openings and plugs in openings.
- Yes  No 4. Check radius rod attachment point.
- Yes  No 5. Check attachment points of studs, castings, brackets, accessories, etc.
- Yes  No 6. Check plumbing openings on shell (feedwater nozzles, steam take off, water column, etc.)
- Yes  No 7. Check handhole openings in shell.

- Yes  No      8. Lap seam or buttstrap
  - a. Check for leakage around seams or joint rivets.
  - b. Confirm joint efficiency based on number of rows of rivets and type of joint.
- Yes  No      9. Identify and check any external contour that does not appear normal.
- Yes  No      10. Jacket
  - a. Does jacket cover any critical areas or make them difficult to observe?
  - b. Is barrel pitted or corroded under jacket?

**Wrapper Sheet**

- Yes  No      1. Check handhole openings (material thickness, gasket area, etc.)
- Yes  No      2. Check for seepage around attachment points (wing sheets, axle supports, etc.)
- Yes  No      3. Check condition of seams joining wrapper to throat sheet and rear head.
- Yes  No      4. Check condition of seams joining throat sheet to barrel.
- Yes  No      5. Check external shapes or contours that do not appear normal.
- Yes  No      6. Check for seepage around staybolt heads.
- Yes  No      7. Check condition of staybolt heads.
- Yes  No      8. Check condition of threaded openings.
- Yes  No      9. Check internal surfaces (cracks, pits, material thickness).
- Yes  No      10. Check staybolt thickness and condition.
- Yes  No      11. Check for scale and mud buildup in waterlegs
- Yes  No      12. Check for buildup of dirt and grease between or behind attaching brackets such as wing sheets.
- Yes  No      13a. Dry bottom boilers
  - 1. Check seams at bottom of waterlegs in ash pan area.
  - 2. Do you need to remove ash pans and grates to observe above seams?
  - 3. Check condition of grate support brackets
- Yes  No      13b. Wet bottom boilers
  - 1. Check ash pan area for pits and staybolt head condition.
  - 2. Check inside bottom of wrapper and staybolt condition.
  - 3. Check condition of lap seam in wrapper.
  - 4. Check condition of ash pan drain table if present.
- Yes  No      14. Check for presence and condition of blow-down valve

### Dome

- Yes  No 1. Check for presence and condition of drainback holes in shell.
- Yes  No 2. Check condition of main line shutoff valve.
- Yes  No 3. Check condition of plumbing on mainstream line and on dome.
4. Check condition of dome seams and seams between dome and boiler shell.
- Yes  No a. Is seepage present?
- Yes  No b. Can interior seams be observed?
5. Check for presence and condition of pressure gage.
- Yes  No a. Is there a siphon and what is its condition?
- Yes  No b. Is the gage readable from the operator's position?
- Yes  No c. Has the gage been calibrated or checked against another gage?
- Yes  No d. If a shutoff valve is present, its handle shall indicate open position, or the handle shall be wired open.
6. Check for presence and condition of safety valve.
- Yes  No a. Does it have its own inlet/outlet piping with no possibility of closure?
- Yes  No b. Check that the inlet pipe size is not smaller than the valve inlet size.
- Yes  No c. Check that the outlet pipe size is not smaller than the valve outlet size.
- Yes  No d. Is it a National Board capacity certified, ASME "V"/NB "VR" stamped valve of proper pressure and capacity rating for the boiler heating surface?
- Yes  No e. Does it have a try lever?
- Yes  No f. Is it sealed with a factory seal?

### Water Column and Water Glass

- Yes  No 1. Is water glass calibrated to level of crown sheet?
- Yes  No 2. Check condition of try-cock valves and blowdown valves on column and glass.
- Yes  No 3. Check condition of glass (cracks or scratches).
- Yes  No 4. Are there leaks around the water glass gaskets?

### Firebox

- Yes  No 1. Check for bulges or abnormal shapes (What caused them?).
- Yes  No 2. Check seams around fire door.
- Yes  No 3. Check for sediment buildup over fire door opening rear head.
- Yes  No 4. Check for sediment buildup over peephole opening in wrapper sheet (where applicable).
5. Check condition of fusible plug. (Must be removed for observation.)
- Yes  No a. Is it an ASME plug?
- Yes  No b. Check condition of top surface. (May need to brush it off.)
- Yes  No 6. When fusible plug is removed, check crown sheet thickness at that location and thread condition.
- Yes  No 7. Fireside fusible plug must protrude a minimum of one (1) in. into water.

- Yes  No 8. Waterside fusible plug may not protrude into fire area of more than one (1) in.
- Yes  No 9. Water glass calibration can only be done when crown sheet and fusible plug can be seen and measured. (A recommended minimum water level may be determined as follows: With engine sitting on level ground and water just observable at the bottom of the glass, the crown sheet should be covered by a minimum of at least 2-1/2 in. plus on a full-size boiler.
- Yes  No 10. Check staybolt condition, especially near top surface of crown sheet.
- Yes  No 11. Check through stays, strong backs, knee braces, etc. on rear head.
- Yes  No 12. Check handhole openings, threaded openings and plugs in rear head.
- Yes  No 13. Check condition of rear tube sheet, and check if rear end of tubes are beaded.
- Yes  No 14. Check condition of staybolt heads inside fire box.
- Yes  No 15. Check condition or design of crown sheet. Is it flat-topped or able to trap water?

### External Plumbing

- Yes  No 1. Is black pipe (as opposed to galvanized) used throughout?
- Yes  No 2. Check for use of schedule 80 black pipe required between boiler and first valve.
- Yes  No 3. Are fittings of proper pressure rating for operating pressure?
- Yes  No 4. Are isolation valves present to shut off individual system lines?
- Yes  No 5. Are two separate feedwater systems present and operable?
- Yes  No 6. Check plumbing for frost damage.
- Yes  No 7. Are plumbing support brackets present where needed?
- Yes  No 8. Fittings dates are to be stamped, stenciled or recorded on boiler records.
- Yes  No 9. 20-year life on piping except for main steam line which shall be evaluated as to life.

### Ultrasonic Testing (Every fifth year)

### Hydrostatic Pressure Test (Annually)

1. Hydrostatic pressure test should be between maximum allowable working pressure and 1.25 times maximum allowable working pressure with water temperature @ 60°-120° F.
2. An accurate gage with proven accuracy shall be used when hydrostatically pressure testing a boiler. The engine gage shall be calibrated at this time.
3. Safety valve may be checked against test gage and/or engine gage. (Test should only be performed at a pressure greater than 75% of the stamped set pressure of the valve or the safety valve or lifting lever may be damaged.)

Comments